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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 10

Application Number: 09/090,358
Filing Date: June 04, 1998
Appellant(s): LOPRETE ET AL.

Theodore W. Olds
For Appellant

EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed 13 July 2000.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-7, 12-14 and 16-20 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

✓5,803,716	Wallis, et al.	9/1998
✓4,137,798	Sisk, et al.	2/1979

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-7, 12-14 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sisk, et al. (U.S. Pat. No. 4,137,798, hereinafter "Sisk") in view of Wallis, et al. (U.S. Pat. No. 5,803,716, hereinafter "Wallis").[1]

Sisk discloses a two-speed drive apparatus for controlling the displacement of a compressor of a heat pump. Sisk's apparatus comprises a reversible electric motor 18. Said motor, when driven in a first direction, i.e. clockwise as viewed in Figs. 2 and 3, drives said compressor at a first rate which is approximately equal to said first speed. From Col. 3, lines 33-40 of Sisk, "This [clockwise rotation] in turn, causes a rotation of ring gear 40 in a clockwise sense..., there being no relative motion between the sun, planetary and ring gears inasmuch as they are essentially locked together and rotate at the speed of rotation of the drive shaft 12." Further, said motor is operable to be rotated in an opposed direction, i.e. counter-clockwise, said compressor being caused to be driven in said forward direction at a rate of speed which is different from said first rate by a mechanical transmission 16. From Col. 3, lines 41-58 of Sisk, "When shaft 12 is rotated in a counterclockwise direction...planetary gears 34 rotate relative to shafts 36 in a clockwise sense... under the influence of sun gear 20. This rotation of the planetary gears causes clockwise rotation of ring gear 40 and thereby driven shaft 14... Thus, regardless of which direction drive shaft 12 rotates, driven shaft 14 will always rotate in the same direction. The speed of rotation of the driven shaft will, of course, be greater when shaft 12 rotates in a clockwise sense."

[1] Claims are grouped by dependency, the three independent claims and claims respectively dependent therefrom. Some redundancy in treating claim limitations was necessitated by repetition of those limitations, and was done to preserve the dependency groupings.

While Sisk discloses the application of this apparatus in a heat pump compressor, he does not specifically disclose a scroll compressor. Such a scroll compressor is known in the art, for example from Wallis.

Wallis discloses a motor driven scroll compressor comprising a first non-orbiting scroll member 70, and a second orbiting scroll 58. Said orbiting scroll is driven by an eccentric crank pin 34 mounted atop crankshaft 32, rotatively driven by motor 28. In the background of the invention, Col. 1, lines 24-37, Wallis states, "Scroll machines are becoming more and more popular for use as compressors in both refrigeration as well as air conditioning and heat pump applications due primarily to their capability for extremely efficient operation..." Therefore, Wallis teaches that scroll compressors are both highly efficient and suitable for heat pump applications.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify a heat pump including the two-speed drive apparatus as disclosed by Sisk to include a scroll compressor such as disclosed by Wallis since Wallis teaches that scroll compressors are particularly well suited for heat pump applications, and/or in order to advantageously increase the efficiency of the compressing means disclosed by Sisk. [Claim 1]

As noted above, said different rate of compressor rotation when said motor is driven in an opposed direction is lower than said first rate of compressor rotation. [Claim 2] Said mechanical transmission 16 comprises a gear transmission, namely a sun gear 20, a planet carrier 24, planetary gears 34, and a ring gear 40. [Claim 3] Said gear transmission provides a gear reduction. [Claim 4] Such apparatus is well known in the art as a planetary gear transmission. [Claim 5] An over-running clutch 38 selectively transmits rotation from a motor shaft to said

compressor, in the case of the combination at hand an orbiting scroll, when said shaft is driven in said one and said opposed directions, as described in Col. 3, lines 25-58. Sisk further discloses in Col. 4, lines 4-5 "[C]hoice of clutch is a matter of design convenience." [Claim 6]

Said gear transmission of Sisk is to be provided between the drive shaft of the motor and the compressor. In the case of the combination, proper function of the scroll compressor requires the eccentric portion to interface directly with the orbiting scroll, an this the combination described above would inherently have placed said gear transmission between a shaft portion 12, and the eccentric crankpin. [Claim 7]

A one-way clutch 38 connects said rotary motor so said compressor when said motor is driven in said forward (clockwise) direction, such that said transmission does not affect the speed of movement of said compressor when said motor is driven in said forward direction (Sisk Col. 3, lines 33-40, *supra*), and said one-way clutch 38 allows relative rotation between said motor and said compressor when said motor is driven in said reverse (counter-clockwise) direction such that the drive of said compressor by said rotary motor passes through said transmission when said motor is driven in said reverse direction (Sisk Col. 3, lines 41-58, *supra*). [Claim 17] One of said forward and reverse directions must inherently be a forward direction. Regardless, forward and reverse directions are arbitrary, and not limiting the structure of the apparatus. In the case of Sisk, forward and reverse directions are clockwise and counter-clockwise, respectively. [Claim 19]

The scroll compressor disclosed by Wallis comprises a first stationary scroll 70 having a base and a scroll wrap 72 extending from said base, a second orbiting scroll 58 having a base and

a scroll wrap 60 interfitting with said first scroll wrap. Sisk comprises a bi-directional rotary motor 18 for driving a compressor, said motor being driven in a forward direction and in a reverse direction, said motor being driven at a first speed in said forward and reverse directions; and a mechanical transmission 16 for driving said compressor in said forward direction when said motor is driven in both said reverse and forward directions, and at a speed which approximates the speed of said motor when said motor is driven in said forward direction, and said transmission reducing the speed of movement of said compressor when said motor is driven in said reverse direction.

The operation of Sisk, and the advantages of Wallis are described above. The combination thereof would have been obvious to a person having ordinary skill in the art at the time the invention was made since Wallis teaches that scroll compressors are particularly well suited for heat pump applications, and/or in order to advantageously increase the efficiency of the compressing means disclosed by Sisk. [Claim 12]

Said mechanical transmission 16 comprises a gear transmission, namely a sun gear 20, a planet carrier 24, planetary gears 34, and a ring gear 40. Such apparatus is well known in the art as a planetary gear transmission. [Claim 13] Said gear transmission of Sisk is to be provided between the drive shaft of the motor and the compressor. In the case of the combination, proper function of the scroll compressor requires the eccentric portion to interface directly with the orbiting scroll, an this the combination described above would inherently have placed said gear transmission between a shaft portion 12, and the eccentric crankpin. [Claim 14] A one-way clutch 38 connects said rotary motor so said compressor when said motor is driven in said forward (clockwise) direction, such that said transmission does not affect the speed of movement

of said compressor when said motor is driven in said forward direction (Sisk Col. 3, lines 33-40, *supra*), and said one-way clutch 38 allows relative rotation between said motor and said compressor when said motor is driven in said reverse (counter-clockwise) direction such that the drive of said compressor by said rotary motor passes through said transmission when said motor is driven in said reverse direction (Sisk Col. 3, lines 41-58, *supra*). [Claim 16]

The scroll compressor disclosed by Wallis comprises a first stationary scroll 70 having a base and a scroll wrap 72 extending from said base, a second orbiting scroll 58 having a base and a scroll wrap 60 interfitting with said first scroll wrap. Sisk comprises a bi-directional rotary motor 18 for driving a compressor, said motor being driven in a forward direction and in a reverse direction, said motor being driven at a first speed in said forward and reverse directions; and a mechanical transmission 16 for driving said compressor in said forward direction when said motor is driven in both said reverse and forward directions, and at a speed which approximates the speed of said motor when said motor is driven in said forward direction, and said transmission reducing the speed of movement of said compressor when said motor is driven in said reverse direction. A one-way clutch 38 connects said rotary motor so said compressor when said motor is driven in said forward (clockwise) direction, such that said transmission does not affect the speed of movement of said compressor when said motor is driven in said forward direction (Sisk Col. 3, lines 33-40, *supra*), and said one-way clutch 38 allows relative rotation between said motor and said compressor when said motor is driven in said reverse (counter-clockwise) direction such that the drive of said compressor by said rotary motor passes through

said transmission when said motor is driven in said reverse direction (Sisk Col. 3, lines 41-58, *supra*).

The operation of Sisk, and the advantages of Wallis are described above. The combination thereof would have been obvious to a person having ordinary skill in the art at the time the invention was made since Wallis teaches that scroll compressors are particularly well suited for heat pump applications, and/or in order to advantageously increase the efficiency of the compressing means disclosed by Sisk. [Claim 18] One of said forward and reverse directions must inherently be a forward direction. Regardless, forward and reverse directions are arbitrary, and not limiting the structure of the apparatus. In the case of Sisk, forward and reverse directions are clockwise and counter-clockwise, respectively. [Claim 20]

(11) Response to Argument

Appellant argues that the Sisk apparatus would not provide the claimed speed relationships due to the presence of the planetary transmission. However, the operation of the Sisk apparatus as described above with reference to Col. 3, lines 25-58, clearly shows that Appellant's assertion is in error.

Appellant argues that it is not suggested to combine the apparatus of Sisk with a scroll compressor such as Wallis due to the detrimental nature of reverse rotation in a scroll compressor. Appellee recognizes and concedes the fact that reverse rotation of the orbiting scroll in a scroll compressor is detrimental. However, Sisk clearly states in Col. 3, lines 55-56, "[R]egardless of which direction the drive shaft 12 rotates, the driven shaft 14 will always rotate in the same direction." From this, it would have been obvious to an artisan of ordinary skill that

the orbiting scroll or Wallis, when attached to driven shaft 14 of Sisk, would be in no danger of being rotated in a reverse direction. Therefore, for the reasons noted above, the combination is proper.

Appellant argues that Sisk does not meet the limitation of a one-way clutch to ensure that the drive passes through the transmission when the motor is driven in the reverse (counter-clockwise) direction. Sisk does comprise a one-way clutch, overriding clutch 38. The description of the operation of said clutch clearly shows that the Sisk apparatus meets this claim limitation. The same is true of the drive passing 'through' the transmission, in the engineering sense of the term, when the motor rotates in the reverse direction, but not in the forward direction.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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July 26, 2000

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